

Remarks

Claims 1-17, 21, 23, and 24 are pending, and reconsideration of the rejections thereto is requested.

Applicant has canceled both claims identified as claim "22" and represented the subject matter thereof in claims 23 and 24, respectively. Withdrawal of the objection to the claims is therefore requested.

Claims 1, 3-5, 12-14, 16-17, and 21-23 stand rejected under 35 U.S.C. §102(b) as being anticipated by Wu et al. (USP 6,013,581, hereinafter "Wu"). As set forth at MPEP §2131, it is well-established:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Thus, if a claim calls for a single element not found in the single prior art reference, then the rejection cannot stand. While there are numerous distinctions between that called for in claims 1, 3-5, 12-14, 16-17, 21, 23 and 24 and that disclosed by Wu, the reference nevertheless fails to teach a method for increasing a time dependent dielectric breakdown lifetime of a semiconductor device that includes, in part, performing an inter-treatment or other treatment on a glue layer that affects the adhesiveness of the upper and lower surfaces thereof.

Wu is directed to "[a] method for preventing the occurrence of poisoned trenches and vias in a dual damascene process..." Wu, Abstract. The Examiner has asserted that Wu's method includes the performance of an inter-treatment on a glue layer. However, as set forth at column 3, lines 37-65, Wu makes no such teaching.

Specifically, Wu discloses that "a plasma 10 treatment is performed on partial surface of the dielectric layers 206 and 210 that is exposed within the opening 218 consisting of the trench 214 and the via hole 216." Wu, col. 3, ll. 37-41. At column 51-65, Wu further teaches:

As shown in FIG. 2E, the opening 218 is filled with a conductive material, such as a barrier/glue layer 222 and a metal layer 224. The barrier/glue layer 222 conformal to the substrate 200 is formed on the top of the dielectric layer 210 and the inner surface of openings 218, wherein the barrier/glue layer 222 includes titanium/titanium nitride, tantalum, tantalum nitride, tungsten nitride, titanium

nitride, boron nitride, or tantalum-silicon-nitride (TaSiN). The metal layer 224 is deposited on the barrier/glue layer 222 and filled the openings 218, wherein the metal layer 224 includes aluminum, tungsten, gold, or copper. By performing a planarization process, such as a chemical mechanical polishing process, the unwanted barrier/glue layer 222 and the metal layer 224 located on the top of the dielectric layer 210 are removed to form a dual damascene structure 226.

As the above excerpts explicitly shows, Wu teaches the application of a glue layer after application of a plasma treatment. Thus, the plasma treatment disclosed by Wu affects dielectric layers -- not a glue layer, as presently claimed.

Further, Wu teaches that a "metal layer 224 is deposited on the barrier/glue layer 222 and filled the openings 218, wherein the metal layer 224 includes aluminum, tungsten, gold, or copper." Wu, col. 3, ll. 58-61. In describing the deposition of a metal layer, Wu neither teaches nor suggests that the glue or barrier layer has first been prepped in any manner to improve its adhesiveness.

Accordingly, for at least the reasons set forth above, it is believed that claims 1, 3-5, 12-14, 16-17, and 21-23 are directed to patentably distinct subject matter. Allowance thereof is requested.

With regards to the rejections of claims 2, 6, 7-11, and 15 under 35 U.S.C. §103(a), Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 2, 6, 7-11, and 15 depending from and limiting what are believed otherwise allowable independent claims, it is believed additional remarks are not necessary and, therefore, Applicant requests allowance of claims 2, 6, 7-11, and 15 at least pursuant to the chain of dependency.

Conclusion

It is clear from at least the foregoing that independent claims 1, 12, and 21 are in condition for allowance. Dependent claims 2-11, 13-17, 23, and 24 depend from and further limit independent claims 1, 12, and 21 and therefore are allowable as well.

As no outstanding issues remain, an early formal notice of allowance of claims 1-17, 21, 23, and 24 is requested.

Please grant any extension of time required to enter this After-Final Amendment and charge any additional required fees to Deposit Account No. 08-1394.

Respectfully submitted,



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